

CLAIMS

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1. A non-contact position sensor comprising:  
a magnetic circuit comprising at least one magnet and a magnetically  
5 continuous magnetic body;  
at least one magnetic sensor element disposed to said magnetic circuit;  
and  
an object to be detected, said object positioned in said magnetic circuit.

10 2. The non-contact position sensor according to claim 1, wherein said  
magnetic body includes a discontinued portion, and said object to be detected is  
positioned in any one of said discontinued portion, and between said discontinued  
portion and said magnet.

15 3. The non-contact position sensor according to claim 1, wherein  
said magnetic body comprises two magnetic bodies, each having  
generally an L-shaped tip end, and  
said magnetic sensor element is disposed to the tip end of at least one of  
said two magnetic bodies.

20 4. The non-contact position sensor according to claim 1, wherein  
said magnetic body has one magnetic pole of said magnet disposed to  
generally a center portion thereof, said magnetic body has L-shaped tip ends at  
both ends thereof, and  
25 said object to be detected is disposed in a position among said one  
magnetic pole, an opposite pole of said magnet and the tip ends of said magnetic  
body.

30 5. The non-contact position sensor according to claim 1, wherein  
said magnetic circuit comprises a magnetic body of magnetically closed  
circuit and two magnets disposed to an inside of said magnetic body of closed  
circuit,  
said magnetic sensor element is disposed to the inside of said magnetic  
body of closed circuit,  
35 and said object to be detected is positioned between said two magnets.

Fig. 14-15

6. The non-contact position sensor according to any one of claim 1 to claim 5, wherein said object to be detected has a cross section of any one of a sectorial shape, semicircular shape and I shape.

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5 7. The non-contact position sensor according to any one of claim 1 to claim 4, wherein a tip end of said magnetic body is slanted with respect to an axis connecting an N-pole and an S-pole of said magnet.

10 8. The non-contact position sensor according to claim 5, wherein said magnetic body has a portion having a thickness smaller than the other portion, and said magnetic sensor element is disposed to said portion of smaller thickness.

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15 9. The non-contact position sensor according to claim 5, wherein the portion of said magnetic body where said magnetic sensor element is disposed has a stepped level of different plane from the other portion.

20 10. The non-contact position sensor according to claim 5, wherein a lateral width of each said two magnets is generally equal to a diameter of said object to be detected.

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25 11. The non-contact position sensor according to claim 1, wherein said magnetic circuit comprising a U-shaped first magnetic body, a U-shaped second magnetic body, and two magnets, said two magnets are disposed between said two U-shaped magnetic bodies arranged vertically, and said magnetic sensor element is disposed to a generally center portion between said two U-shaped magnetic bodies.

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30 12. The non-contact position sensor according to claim 11, wherein the portion of each said U-shaped magnetic bodies where said magnetic sensor element is disposed has a stepped level of different plane from the other portion.

35 13. The non-contact position sensor according to claim 12, wherein the portions of said U-shaped first and second magnetic bodies where said magnetic

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sensor element is disposed are in contact to each other via said magnetic sensor element.

5 14. The non-contact position sensor according to claim 11, wherein at least one of said two U-shaped magnetic bodies has a shape that comes in contact with an external shape of said object to be detected.

10 15. The non-contact position sensor according to claim 11, wherein each of said two U-shaped magnetic bodies has stepped planes, and said two magnets confront each other at different planes.

15 16. The non-contact position sensor according to claim 11, wherein each of said two U-shaped magnetic bodies further has a magnet supporting section, and said two magnets confront each other at different planes.

20 17. The non-contact position sensor according to claim 1, wherein said magnetic circuit comprising a U-shaped first magnetic body, a U-shaped second magnetic body of a greater size than said first magnetic body, and two magnets, said two magnets are disposed between said two U-shaped magnetic bodies, and said magnetic sensor element is disposed within a U-shaped space of said U-shaped first magnetic body.

25 18. The non-contact position sensor according to claim 17, wherein said U-shaped first magnetic body and said U-shaped second magnetic body are disposed to a same plane.

30 19. The non-contact position sensor according to claim 17, wherein said U-shaped first magnetic body and said U-shaped second magnetic body are disposed generally perpendicularly with respect to each other.

35 20. The non-contact position sensor according to claim 19, wherein said U-shaped second magnetic body has an aperture formed in generally the center thereof for receiving an insertion of said object to be detected.

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21. The non-contact position sensor according to claim 19, wherein said U-shaped second magnetic body comprises two parts, and contacting sides of said two parts form a portion for receiving an insertion of said object to be detected.

22. The non-contact position sensor according to claim 1, wherein said magnetic circuit comprising a U-shaped first magnetic body, a U-shaped second magnetic body, and two magnets, said two magnets are disposed between said U-shaped first and second magnetic bodies arranged vertically, said magnetic sensor element is disposed to a generally center portion between said U-shaped first and second magnetic bodies, and said object to be detected is disposed in a linearly movable manner between both ends of said U-shaped first magnetic body and both ends of said U-shaped second magnetic body.

23. The non-contact position sensor according to claim 22, wherein one side arm of said U-shaped first magnetic body has a width generally equal to a width of one side arm of said U-shaped second magnetic body, another side arm of said U-shaped first magnetic body has a width generally equal to a width of another side arm of said U-shaped second magnetic body, and a detectable distance of said object to be detected equals to a distance derived by subtracting a length of a defective section of said object from the sum of the width of said one side arm, the width of said another side arm, and a space between said one side arm and said another side arm.

24. The non-contact position sensor according to claim 23, wherein the length of said defective section is longer than any of the width of said one side arm and the width of said another side arm.

25. The non-contact position sensor according to claim 22, wherein a portion of any of said U-shaped first and second magnetic bodies where said magnetic sensor element is disposed has a stepped level of different plane from the other portion of said U-shaped first and second magnetic bodies.

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~~26. The non-contact position sensor according to claim 25, wherein the portions of said U-shaped first and second magnetic bodies where said magnetic sensor element is disposed are in contact to each other via said magnetic sensor element.~~

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